



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/822,707	04/13/2004	Dien Nguyen	079173--0117	2912
22428	7590	06/23/2006		
FOLEY AND LARDNER LLP SUITE 500 3000 K STREET NW WASHINGTON, DC 20007			EXAMINER CHUO, TONY SHENG HSIANG	
			ART UNIT	PAPER NUMBER
			1745	

DATE MAILED: 06/23/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/822,707

Applicant(s)

NGUYEN, DIEN

Examiner

Tony Chuo

Art Unit

1745

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 13 April 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-36 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-36 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 4/13/04.
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Information Disclosure Statement***

1. The information disclosure statement (IDS) submitted on 4/13/04 was filed on 4/13/04. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

### ***Drawings***

2. The drawings filed on 4/13/04 are accepted by the examiner.

### ***Specification***

3. The disclosure is objected to because of the following informalities: on paragraph [0029], the gas separator plate "3" should be changed to gas separator plate "103". Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:  
  
The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
5. Claim 1 recites the limitation "first separator plate ceramic layer" and "second separator ceramic plate layer" in "at least two ceramic layers". There is insufficient antecedent basis for this limitation in the claim.
6. Claim 24 recites the limitation "first ceramic layer" and "second ceramic layer" in "at least two non-ionically and non-electrically conductive ceramic layers". There is insufficient antecedent basis for this limitation in the claim.

Art Unit: 1745

7. Claim 26 recites the limitation "first or second unsintered ceramic layer" in method of making an interconnect. There is insufficient antecedent basis for this limitation in the claim.

***Claim Rejections - 35 USC § 102***

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

9. Claims 1-36 are rejected under 35 U.S.C. 102(e) as being anticipated by Cable et al (US 2003/0077498). Regarding claims 1, 2, 13, and 17, the Cable reference teaches an interconnect "120" for a solid oxide fuel cell, comprising: a non-ionically and non-electrically conductive ceramic gas separator plate "122","124","125","126","127" comprising opposing major surfaces and at least two ceramic layers; a conducting layer "134" located inside the ceramic gas separator plate between the first ceramic layer and the second ceramic layer; a plurality of first vias "160b" which extend from the first major surface of the ceramic gas separator plate up to the conducting layer; a plurality of second vias "160c" which extend from the second major surface of the ceramic gas separator plate up to the conducting layer, wherein the second vias are offset from the first vias; a plurality of electrically conductive first fillers located in the plurality of first vias, wherein the first fillers are exposed below, in or over the first major surface of the gas separator plate and the first fillers are located in electrical contact with the

Art Unit: 1745

conducting layer; and a plurality of electrically conductive second fillers located in the plurality of second vias, wherein the second fillers are exposed below, in or over the second major surface of the gas separator plate and the second fillers are located in electrical contact with the conducting layer (See Figure 2 and 6, paragraph [0065]).

Examiner's note: the conducting layer "134" is not labeled in Figure 6, but is shown in the figure as the layer between the vias "160b" and vias "160c" in region Y.

Regarding claims 3-5, 14-16, and 28-30, it also teaches a conducting layer that is a platelet that extends substantially parallel to gas separator plate surfaces and electrically connects each of the first fillers to each of the second fillers (See Figure 6).

Regarding claims 6, 18, and 31, it also teaches a first separator plate ceramic layer consisting of layers "124" & "125", a second separator plate ceramic layer "122", and a third separator plate ceramic layer consisting of layers "126" & "127", wherein the second separator plate ceramic layer is located between the first and the third separator plate ceramic layers; a plurality of third vias "160c" extending through the third separator plate ceramic layer but not through the first or second separator plate ceramic layers, wherein the third vias are offset from the second vias "160a"; a plurality of electrically conductive third fillers located in the plurality of third vias "160c", wherein each of the plurality of third fillers is electrically connected to at least one second filler; and a second conducting layer "134" located between the second separator plate ceramic layer and the third separator plate ceramic layer, such that the second conducting layer contacts at least one second filler and at least one third filler to electrically connect at least one second filler to at least one third filler (See Figure 6, Section Y).

Regarding claims 7, 8, 19, and 32, it also teaches a gas separator plate comprising a first major surface and a second major surface separated in the separator plate thickness direction; the separator plate ceramic layers are stacked in the separator plate thickness direction; the first fillers are exposed below, in or over the first major surface of the separator plate; and the second fillers are exposed below, in or over the second major surface of the separator plate and further comprising gas flow grooves "130" located in the first and the second major surfaces of the separator plate (See Figure 6).

Regarding claims 9-10, 20-21, and 33-34, it also teaches a solid oxide fuel cell stack, comprising: a plurality of interconnects "120" and a plurality of solid oxide fuel cells "115" wherein: each solid oxide fuel cell comprises a plate shaped fuel cell comprising a ceramic electrolyte, an anode located on a first surface of the electrolyte and a cathode located on a second surface of the electrolyte; each interconnect is located between adjacent fuel cells in the stack; each first filler in each interconnect is electrically connected to an adjacent cathode of a first adjacent fuel cell; and each second filler in each interconnect is electrically connected to an adjacent anode of a second adjacent fuel cell, such that each interconnect electrically connects an anode of a first fuel cell and a cathode of an adjacent second fuel cell (See Figure 2 and paragraphs [0038],[0039]). Examiner's note: When a stack of individual fuel cells is provided, multiple interconnects are necessary (See paragraph [0003]).

Regarding claims 11-12, 22-23, and 35-36, it also teaches the coefficient of thermal expansion of the materials used for the stack components should be substantially similar such that the interconnect structure and the additional ceramic

sheets are of the same material wherein the electrolyte comprises yttria stabilized zirconia; the ceramic separator plate comprises a blend of alumina and yttria stabilized zirconia; and the first and second fillers and the conducting layer selected from the group consisting of platinum, alloys of silver, alloys of palladium, and high chromium alloys (See paragraph [0042],[0070],[0071], and claim 38). Examiner's note: Specifically, it is disclosed that the CTE of the materials used for interconnect structure and electrolyte must be substantially matched which is viewed as less than one percent (See paragraph [0071]).

Regarding claim 24, it also teaches a method of making an interconnect for a solid oxide fuel cell, comprising: providing at least two non-ionically and non-electrically conductive ceramic layers; forming a plurality of first apertures extending through the first ceramic layer; forming a plurality of second apertures extending through the second ceramic layer; stacking the first ceramic layer and the second ceramic layer to form a ceramic gas separator plate, aligning the ceramic layers such that the first apertures are offset from the second apertures in the stacked layers; forming a plurality of electrically conductive first fillers in the plurality of first apertures; and forming a plurality of electrically conductive second fillers in the plurality of second apertures, such that each of the plurality of first fillers is electrically connected to at least one second filler (See claims 51 and 58).

Regarding claims 25 and 26, it also teaches forming a conducting layer on at least one of the first ceramic layer and the second ceramic layer prior to stacking the first ceramic layer and the second ceramic layer; and stacking the first ceramic layer and the second ceramic layer such that the conducting layer is located between the first

and the second ceramic layers wherein: the step of forming the conducting layer comprises forming the conducting layer on a surface of the first or the second unsintered ceramic layer; the step of laminating the first and the second ceramic layers comprises laminating unsintered first and second ceramic layers after the step of forming the interconnecting body; the step of forming the first apertures comprises forming the first apertures in the first unsintered ceramic layer; the step of forming the second apertures comprises forming the second apertures in the second unsintered ceramic layer; and the steps of forming the first and the second fillers comprising forming the fillers such that the conducting layer contacts at least one first filler and at least one second filler to electrically connect at least one first filler to at least one second filler (See Figure 6, paragraph [0076] and claims 51, 58, and 59).

Regarding claim 27, it also teaches co-firing or sintering the laminated first and second ceramic layers to form a sintered ceramic gas separator plate; filling the first vias with the first fillers after the step of sintering; and filling the second vias after the step of sintering (See paragraph [0076]).

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tony Chuo whose telephone number is (571) 272-0717. The examiner can normally be reached on M-F, 8:30AM to 5:00PM.

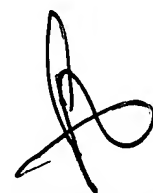
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



Art Unit: 1745

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

TC

A handwritten signature in black ink, consisting of a stylized, cursive 'R' followed by a loop and a horizontal stroke.

**RAYMOND ALEJANDRO  
PRIMARY EXAMINER**